

Atty. Dkt.: UCF-388

Appl No.: 10/786,282

Amendment to the Claims:

This listing of the claims will replace all prior versions, and listings, of claims in the application.

Claim 1 (Currently amended). A flower-shaped vertical alignment (FVA) structure transmissive liquid crystal display with fast response, high contrast ratio and wide view angle comprising:

- (a) a first substrate with a protrusion shaped electrode as the pixel electrode on an interior surface of the first substrate;
- (b) a second substrate with a common electrode on an interior surface of the second substrate, wherein the common electrode includes an empty hole directly above the entire first protrusion shaped electrode to form a gap spacing below the hole on each side of the protrusion shaped pixel electrode between the common electrode and the protrusion shaped pixel electrode;
- (c) aligning layers formed on said first and second substrates providing liquid crystal vertical alignment;
- (d) liquid crystal materials filling a space between said first and second substrates as a liquid crystal cell;
- (e) a first linear polarizer and first wide band quarter-wave film on an exterior surface of the first substrate forming a first circular polarizer; and,
- (f) a second linear polarizer and a second wide band quarter-wave film on an exterior surface of the second substrate forming a second circular polarizer, wherein a circularly polarized light produced by said first and second circular polarizers is used as a

Atty. Dkt.: UCF-388

Appl No.: 10/786,282

light source so that the liquid crystal display operates in a transmissive mode to form the flower-shaped vertical alignment.

Claim 2 (Cancelled).

Claim 3 (Previously presented). The FVA structure liquid crystal display of claim 1

wherein the common electrode empty hole is a hexagon-shaped hole.

Claim 4 (Original). The FVA structure liquid crystal display of claim 1 wherein the

aligning layer is a polymer.

Claim 5 (Original). The FVA structure liquid crystal display of claim 1 wherein the

aligning layer is an inorganic material.

Claim 6 (Previously presented). The FVA structure liquid crystal display of claim 1

wherein the pixel electrode has a shape selected from at least one of: conic, spherical, semi-spherical tower, pyramid and column-like.

Claim 7 (Previously presented). The FVA structure liquid crystal display of claim 1

wherein the pixel electrode includes an indium tin oxide (ITO) layer.

Atty. Dkt.: UCF-388

Appl No.: 10/786,282

Claim 8 (Previously presented). The FVA structure liquid crystal display of claim 1 wherein the shape of the empty hole is selected from at least one of: circular, elliptical ring-shaped, square and rectangular.

Claim 9 (Previously presented). The FVA structure liquid crystal display of claim 1 wherein the common electrode includes an ITO layer in the areas surrounding the empty hole.

Claim 10 (Original). The FVA structure liquid crystal display of claim 9 wherein the common electrode includes wall-bump protrusions on the ITO layer.

Claim 11 (Original). The FVA structure liquid crystal display of claim 1 wherein the liquid crystal materials have a positive ( $\Delta\epsilon > 0$ ) dielectric anisotropy.

Claim 12 (Original). The FVA structure liquid crystal display of claim 1 wherein the liquid crystal materials have a negative ( $\Delta\epsilon < 0$ ) dielectric anisotropy.

Claim 13 (Currently amended). The method of making a wide view angle, fast response, high contrast ratio transmissive liquid crystal display (LCD) with a flower-shaped vertical alignment (FVA) comprising the steps of:

(a) providing a first substrate with a protrusion shaped electrode as a pixel electrode;

(b) providing a second substrate with a common electrode in a parallel arrangement

with the first substrate, the common electrode having an empty hole located directly above

Atty. Dkt.: UCF-388

Appl No.: 10/786,282

the entire pixel electrode leaving a gap spacing below the hole on each side of the pixel electrode between the pixel electrode and the common electrode;

(c) filling the space between the first and second substrates with a liquid crystal

material;

(d) vertically aligning the liquid crystal layer;

(e) applying a voltage to the LCD common and pixel electrodes to generate an electric field distribution for vertical alignment that varies from the center of the pixel electrode toward each adjacent common electrode to form having a flower blossom configuration in order to provide the LCD with the wide view angle, fast response, and high contrast ratio in a transmissive mode.

Claim 14 (Cancel).

Claim 15 (Previously presented). The method of claim 13 wherein the common electrode empty hole is a hexagon-shaped hole.

Claim 16 (Previously presented). The method of claim 13 wherein at least one of the first and the second aligning layer is a polymer.

Claim 17 (Previously presented). The method of claim 13 wherein at least one of the first and the second aligning layer is an inorganic material.

Atty. Dkt.: UCF-388

Appl No.: 10/786,282

Claim 18 (Previously presented). The method of claim 13 wherin the pixel electrode in the first substrate has a shape selected from at least one of: conic, spherical, semi-spherical tower, pyramid and column-like.

Claim 19 (Previously presented). The method of claim 13 wherin the pixel electrode includes an indium tin oxide (ITO) layer.

Claim 20 (Previously presented). The method of claim 13 wherin the shape of the empty hole is selected from at least one of: circular, elliptical ring-shaped, square and rectangular.

Claim 21 (Original). The method of claim 13 wherin the common electrode includes an indium tin oxide (ITO) layer.

Claim 22 (Original). The method of claim 21 wherin the common electrode includes wall-bump protrusions on the ITO layer.

Claim 23 (Original). The method of claim 13 wherin the liquid crystal materials have a positive ( $\Delta\epsilon>0$ ) dielectric anisotropy.

Claim 24 (Original). The method of claim 13 wherin the liquid crystal materials have a negative ( $\Delta\epsilon<0$ ) dielectric anisotropy.

Appl No.: 10/786,282

Atty. Dkt.: UCF-388

Claim 25-26 (Canceled).

Claim 27 (New). The FVA structure liquid crystal display of claim 1 wherein the shape of the protrusion shaped pixel electrode is selected from a group consisting of a conical, spherical, semi-spherical tower, pyramid and column like structure.